
UNIT 2 • REASONING WITH LINEAR EQUATIONS AND INEQUALITIES

Lesson 1: Creating Linear Equations and Inequalities in One Variable

Instruction

Lesson 2.1.2: Creating Linear Inequalities in One Variable

Georgia Standard of Excellence

MGSE9–12.A.CED.1★

Warm-Up 2.1.2 Debrief

1. Eric and his little sister Amber enjoy playing on the seesaw at the playground. Amber weighs 65 pounds. Eric and Amber balance perfectly when Amber sits about 4 feet from the center and Eric sits about $2\frac{1}{2}$ feet from the center. About how much does Eric weigh?

First set up the equation. Students might struggle with which weight is represented by w_1 and which is represented by w_2 . If time allows, show students that as long as the associated weight and distance stay together on the same side of the equation, it doesn't matter which weight is w_1 and which is w_2 .

$$\text{Given: } w_1d_1 = w_2d_2$$

$$w_1 = \text{Amber's weight} = 65 \text{ pounds}$$

$$d_1 = \text{Amber's distance} = 4 \text{ feet}$$

$$w_2 = \text{Eric's weight} = x \text{ pounds}$$

$$d_2 = \text{Eric's distance} = 2\frac{1}{2} \text{ feet} = 2.5 \text{ feet}$$

The unknown is Eric's weight.

Now, make the substitutions.

$$w_1d_1 = w_2d_2$$

Given equation

$$(65)(4) = (x)(2.5)$$

Substitute 65 for w_1 , 4 for d_1 , x for w_2 , and 2.5 for d_2 .

$$260 = 2.5x$$

Simplify.

$$x = 104$$

Divide both sides by 2.5.

Interpret the solution.

In this equation, x represented Eric's weight. Therefore, Eric weighs about 104 pounds.

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2. Their little cousin Aleah joins them and sits right next to Amber. Can Eric balance the seesaw with both Amber and Aleah on one side, if Aleah weighs about the same as Amber? If so, where should he sit? If not, why not?

Set up the equation using $w_1d_1 = w_2d_2$.

$$w_1 = \text{Amber and Aleah's combined weight} = 2(65) \text{ pounds} = 130 \text{ pounds}$$

$$d_1 = \text{Amber and Aleah's distance} = 4 \text{ feet}$$

$$w_2 = \text{Eric's weight} = 104 \text{ pounds}$$

$$d_2 = \text{Eric's distance} = x \text{ feet}$$

This time, the unknown is Eric's distance.

Now, make the substitutions.

$$w_1d_1 = w_2d_2 \quad \text{Given equation}$$

$$(130)(4) = 104(x) \quad \text{Substitute 130 for } w_1, 4 \text{ for } d_1, 104 \text{ for } w_2, \text{ and } x \text{ for } d_2.$$

$$520 = 104x \quad \text{Simplify.}$$

$$x = 5 \quad \text{Divide both sides by 104.}$$

Interpret the solution.

In this equation, x represented Eric's distance from the center of the seesaw. The question asks if it's possible for Eric to balance with Amber and Aleah. It's possible if each side of the seesaw extends at least 5 feet from the center, because Eric needs to sit at least 5 feet away from the center. If each side of the seesaw is shorter than 5 feet, then he cannot balance with his sister and his cousin. Therefore, if each side of the seesaw is 5 feet or longer, then Eric can balance the seesaw.

Connection to the Lesson

- Students are asked to create equations much like they will be asked to create inequalities.
- Solving equations is similar to solving inequalities with a few exceptions.
- The second question's response deals with the inequality concept "at least."